Claims

1. An optical gas sensor comprising a gas chamber for housing a sample gas; a gas opening for injecting the sample gas into the gas chamber or for exhausting the sample gas from the gas chamber; an optical source for projecting infrared toward the sample gas; and an infrared sensor for sensing the intensity of the infrared which has passed through the sample gas, characterized in that:

the wall of the gas chamber is composed of two opposing concave mirrors having different focusing distances but a common focus, and the concave mirrors have curvatures such that the incident light which is parallel to the axis of the concave mirror reflects on the surface of the concave mirror and passes through the focus of the concave mirror, and that the incident light, which has passed through the focus of the concave mirror reflects on the surface of the concave mirror and propagates parallel to the axis of the concave mirror.

2. The optical gas sensor according to claim 1, wherein the gas opening comprise a gas vent located at a certain wall of the gas chamber and a plurality of gas diffusion halls disposed on the lower or upper support plate of the gas chamber.

3. The optical gas sensor according to claim 1 or 2, wherein the plurality of gas diffusion halls is covered by a gas filter.

4. The optical gas sensor according to claim 3, wherein the plurality of gas diffusion halls are preferably disposed on the axis of the incident light from the infrared sensor.

5. The optical gas sensor according to claim 2, wherein the gas vent is advantageously curved downward or equipped with a detachable cap.

6. The optical gas sensor according to claim 1, wherein the surface of the concave mirror is plated by or deposited with gold.

7. The optical gas sensor according to claim 2, wherein the gas chamber contains a parabolic reflecting mirror integrally formed with the support plate of the gas chamber adjacent to the infrared optical source formed at the support plate.

8. The optical gas sensor according to claim 7, wherein a light outlet for projecting at least a part of the infrared light from the infrared optical source is formed on the support plate of the gas chamber.

9. The optical gas sensor according to claim 7 or 8, wherein the infrared optical is disposed on the focus of the parabolic mirror.

10. The optical gas sensor according to claim 2, wherein the support plate of the gas chamber is attached with a height compensation structure for compensating the inclination of the support plate due to the height of the infrared optical source.

11. An optical gas sensor comprising a gas chamber for housing a sample gas; a gas opening for injecting the sample gas into the gas chamber or for exhausting the sample gas from the gas chamber; an optical source for projecting infrared toward the sample gas;

and an infrared sensor for sensing the intensity of the infrared which has passed through the sample gas, characterized in that:

the wall of the gas chamber is composed of two opposing concave mirrors having different focusing distances but a common focus.

12. The optical gas sensor according to claim 11, wherein the gas opening comprise a gas vent located at a certain wall of the gas chamber and a plurality of gas diffusion halls disposed on the lower or upper support plate of the gas chamber.

13. The optical gas sensor according to claim 11 or 12, wherein the plurality of gas diffusion halls are covered by gas filters.

14. The optical gas sensor according to claim 11, wherein the surface of the concave mirror is plated by or deposited with gold.

15. The optical gas sensor according to claim 12, wherein the gas chamber contains a parabolic reflecting mirror formed so that the parabolic reflecting mirror causes the incident light from the infrared source to propagate in parallel with the horizontal support plate of the gas chamber.

16. An optical cavity for a non-dispersive infrared sensor, characterized in that:

the optical cavity is formed by two opposing concave mirrors, the cross-section of the concave mirror is a circular arc, the central points of the two circular arcs exist on the same axis, and the optical cavity is optically closed except for holes for optical source,

optical detector, gas vent and gas diffusion.

17. The optical cavity according to claim 16, wherein the central point of each circular arc coincides with the middle point of the straight line going from one circular arc to the other circular arc.

18. The optical cavity according to claim 16 or 17, wherein the circular arcs have different radius from each other.

19. The optical cavity according to claim 18, wherein the central point of the circular arc having a longer radius exists outside of the circular arc having a shorter radius, and the central point of the circular arc having a shorter radius exists inside of the circular arc having a longer radius.

20. The optical cavity according to claim 19, wherein the optical source and the optical detector are located on a different circular arc, and an incident light from the optical source is irradiated in parallel with the axis on which the central points of the two circular arcs are located, reflected once on each of the circular arc and detected by the optical detector.

21. The optical cavity according to claim 20, wherein the parallel light irradiated from the optical source focuses on the circular arc where the optical detector is located.

22. The optical cavity according to claim 17, wherein the optical source and the

optical detector are located on the same circular arc, and an incident light from the optical source is reflected odd number of times on each of the circular arc and detected by the optical detector.

23. The optical cavity according to claim 22, wherein the incident light from the optical source incidents to or adjacent to a center of the optical cavity, repeats convergence and divergence during the plurality of reflections and reaches the optical detector, and wherein the cross-sectional area of the light reaching the circular arc on which the optical detector is located is larger than that of the light irradiated from the optical source.

24. An optical cavity for a non-dispersive infrared sensor comprising:

an optical source for irradiating infrared light;

an optical detector for ultimately detecting the infrared light from the optical source;

an optical cavity formed by two opposing concave mirrors, wherein the cross-section of the concave mirror is a circular arc, the central points of the two circular arcs exist on the same axis, and the optical cavity is optically closed except for holes for optical source, optical detector, gas vent and gas diffusion;

an optical modulating means for controlling the infrared light irradiated from the optical source, wherein the optical modulating means has a pulse modulation time of 200-600 ms and turn-off time of 2 sec., 2.5 sec. and 3 sec.; and

an amplification means for amplifying an electrical signal from the optical detector.

25. The optical cavity according to claim 24, wherein the optical modulating means sets the optical source with a pulse modulation time of 200ms and turn-off time of 3sec.

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